FETC SUCCESS
U.S. Department of Energy
Federal Energy Technology Center

CLEAN AFFORDABLE POWER

- [x] fossil energy
- [ ] environmental
- [ ] energy efficiency
- [ ] other

M99000283 P6.5

# Super 9-Chrome Alloy

**States Impacted:**
All states that could use pulverized coal-fired systems for power generation.

**Benefit Areas:**
Environment, Reduced $CO_2$ Emissions, Energy Efficiency

**Participants:**
Babcock and Wilcox, Southern California Edison, Dayton Power and Light, Ellwood Quality Steels Company, Oak Ridge National Laboratory

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## Description

Super 9 Chrome, (which stands for 9 percent chromium content), a super-strong steel alloy, is a worldwide industry standard for safer and more reliable coal-fired power plants. The metal is used for superheater tubes, pipes, and forgings.

With code approval of this new alloy, it became possible to increase a power plant's operating steam temperature from approximately 1,005 °F to 1,075 °F and, at the same time, extend the life of power plant equipment. The higher operating temperatures allowed power plants to boost efficiencies by 3 to 5 percentage points — a significant increase in power plant performance, cost savings, and environmental protection. For example, a 500 megawatt (MWe) power plant operating at 38 percent efficiency will burn nearly 111,000 fewer tons of coal each year than the same plant operating at 35 percent efficiency.

## Goals

The goal is distribution of the commercial metal alloy Super 9-Chrome, leading to more efficient coal-fired power plants.

## Tangible Benefits

**National:** Use of this new alloy yields an annual cost savings of $1.8 million in fuel costs and a reduction in $CO_2$ emissions by 280,000 tons. An Oak Ridge National Laboratory study has confirmed more than $200 million in sales resulting from the DOE investment in this advanced material.

**Regional:** The earliest sale of the Super 9-Chrome alloy was for 37 tons to Southern California Edison Company in 1984. In 1988, components of this alloy were sold for use in a coal-fired power plant in Aberdeen, Ohio.